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(56) **References Cited**

2,338,659	A	1/1944	Morehouse
2,396,925	A	3/1946	Morehouse
3,173,987	A	3/1965	Pottruch
4,946,458	A	8/1990	Harms et al.
5,207,678	A	5/1993	Harms et al.
5,242,446	A	9/1993	Steffee et al.
5,474,555	A	12/1995	Puno et al.
5,501,684	A	3/1996	Schlapfer et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CN	102368967	A	3/2012
CN	102458279	A	5/2012

(Continued)

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OTHER PUBLICATIONS

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US 2010/0324599 A1 Dec. 23, 2010

(Continued)

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See application file for complete search history.

(57) **ABSTRACT**

An extender system is configured to couple a vertebral bone anchor that has been previously implanted in a vertebra, or is newly implantable in a vertebra, to an adjacent bone, which can be an additional spinal level or an occiput, for example. The extender system includes an extension member having a body and an engagement member coupled to the body. The extension member defines an aperture extending through the engagement member. A screw is configured to attach the extension member to the vertebral bone anchor. The extension member can be fastened to the adjacent bone.

46 Claims, 20 Drawing Sheets

